

quasar energy group
DOVETAIL BIOENERGY
ANAEROBIC DIGESTION FACILITY

February, 2014
1146 Herr Road
Fairborn, Ohio 45324

PROJECT
LOCATION



| INDEX | |
|-------|--|
| PAGE# | PAGE TITLE |
| CS | COVER SHEET |
| G-1 | PROCESS FLOW DIAGRAM EFFLUENT STORAGE TANK |
| G-2 | PLANT SLUDGE HYDRAULIC PROCESS FLOW |
| SD-1 | SITE DIMENSION PLAN |
| S-1 | STRUCTURAL STORAGE TANK PLAN AND SECTION |
| S-2 | STRUCTURAL TANK DETAILS |
| S-3 | STRUCTURAL TANK DETAILS |
| I-1 | EFFLUENT PUMPING |
| I-2 | EFFLUENT STORAGE TANK |



LOCATION MAP
SCALE: NONE

OWNER/ DEVELOPER

Dovetail Bioenergy
7624 Riverview Road
Cleveland, OH 44131

PROFESSIONAL ENGINEER

Alan R. Johnson, P.E.
Vice President, Project Management
quasar energy group
5755 Granger Road, Suite 320
Cleveland, OH 44131

PROCESS ENGINEER

Ned Mast
Vice President, Engineering
quasar energy group
1363 Gerlaugh Drive
Wooster, OH 44691

TANK ENGINEER

Engineering Associate Inc.
1935 Eagle Pass
Wooster, OH 44691

SITE INFORMATION

Dovetail Bioenergy
1146 Herr Road
Fairborn, Ohio 45324

DESIGN ENGINEER

Randy A. Minor II
Design Engineer
quasar energy group
1363 Gerlaugh Drive
Wooster, OH 44691
Cell: (216)-386-7019

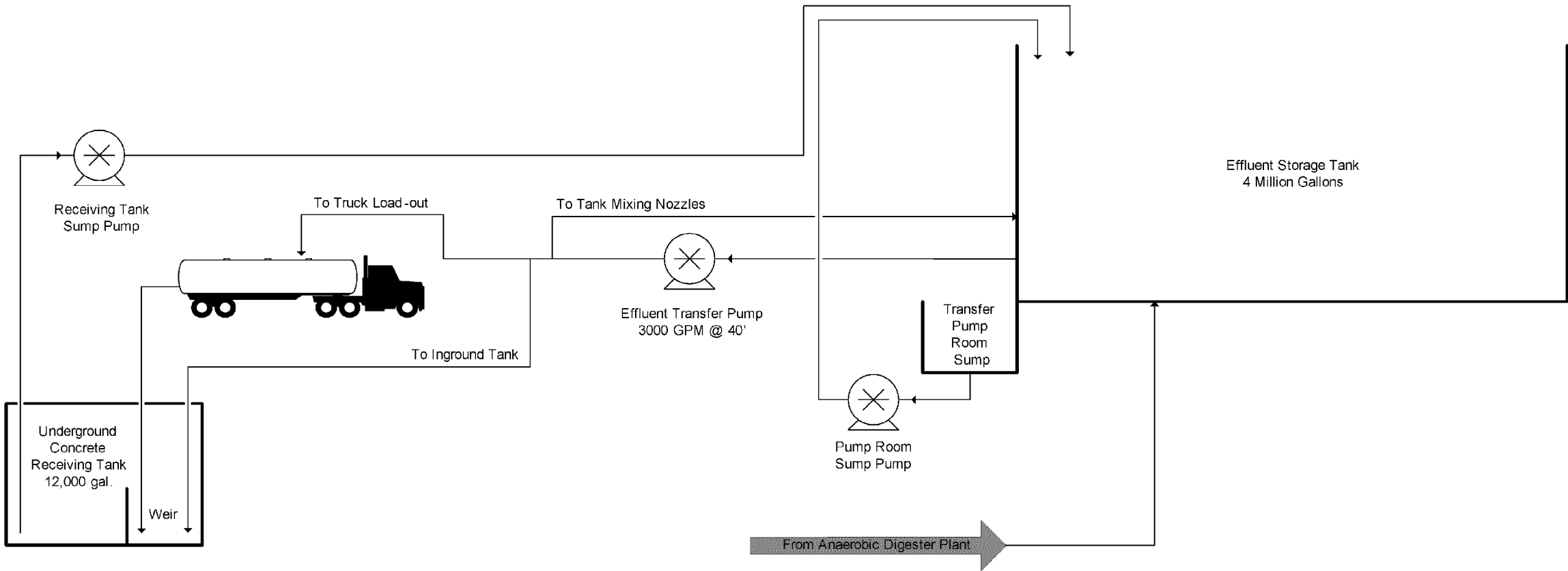
SITE ENGINEER

Stone Environmental
748-A Green Crest Drive,
Westerville, OH 43081



EPA SUBMISSION

Effluent Storage



quasar energy group
7624 Riverview Road
PO Box 31023
Cleveland OH 44141
Phone: 216.986.9999

Stamp:

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| 0 | EPA SUBMISSION | 02/21/14 |
| Rev. | ECN Number | Date |

Drawing Name:
0072-01G-0104
Process Flow Diagram
Effluent Storage Tank

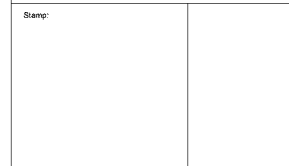
Project Name and Address:
Dovetail Bioenergy
Anaerobic Digestion facility
Ecofarmssystem

0060-FAI-OH-11
1146 Herr Road
Fairborn, Ohio, 45324

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| Area: 67 | Sheet Number: G-1 |
| Author: BR | |
| Calculated: | Checked: |



quasar energy group
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PO Box 31023
Cleveland OH 44141
Phone: 216.986.9999



Scale: 3/32" = 1'0"

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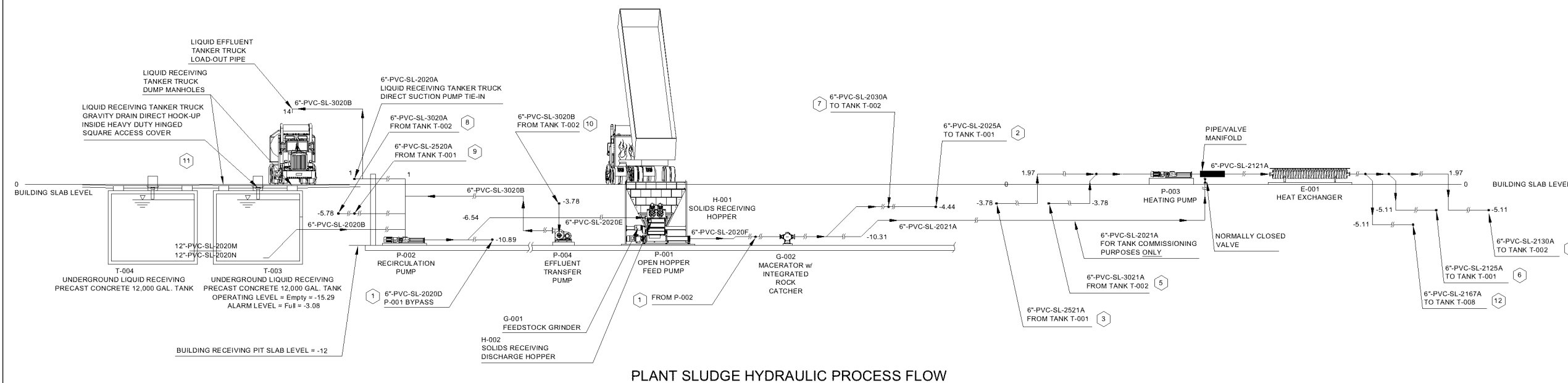
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| 0 | EPA SUBMISSION | 02/21/14 |

Drawing Name:
0069-01P-0001
Plant Sludge Hydraulic Process Flow

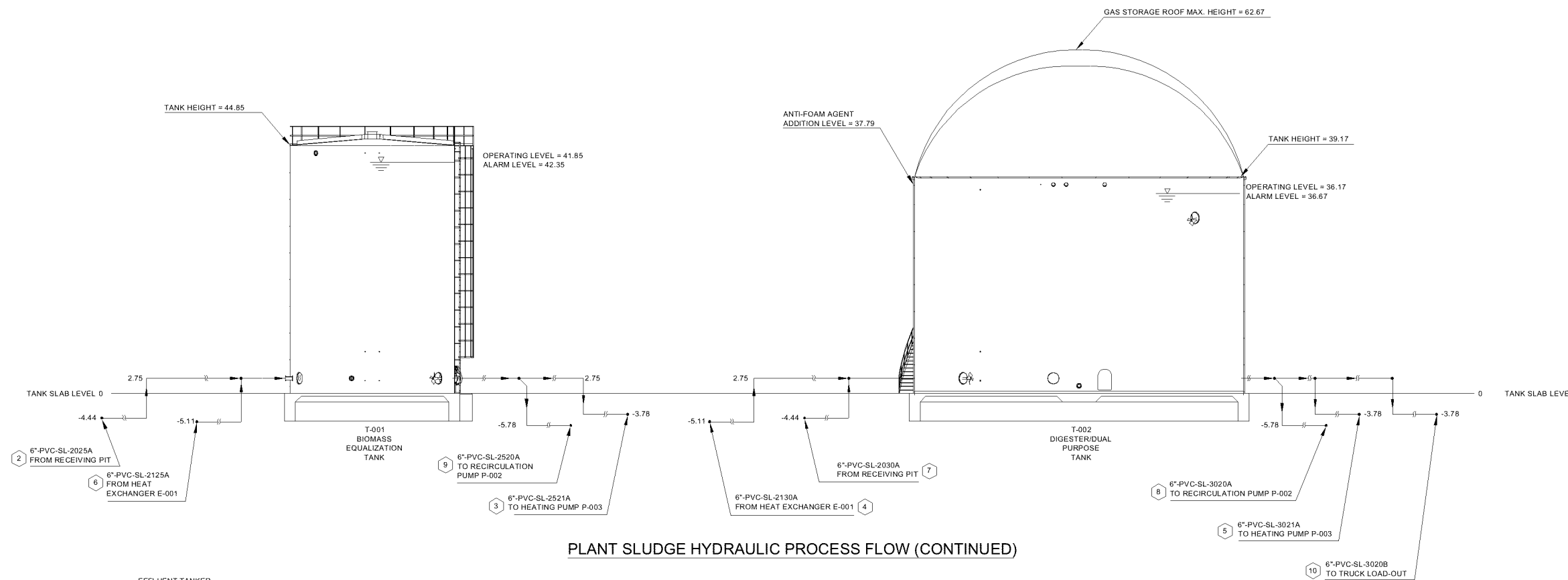
Project Name and Address:
Dovetail Bioenergy
Anaerobic Digestion facility
Ecofarmssystem
0060-FAI-OH-11
1146 Herr Road
Fairborn, Ohio, 45324

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| Author: BR | |
| Calculated: | Checked: NM |

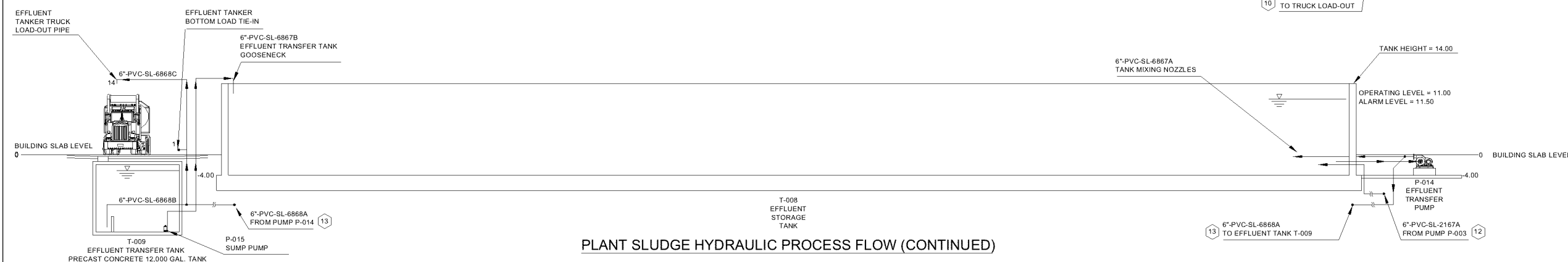
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PLANT SLUDGE HYDRAULIC PROCESS FLOW

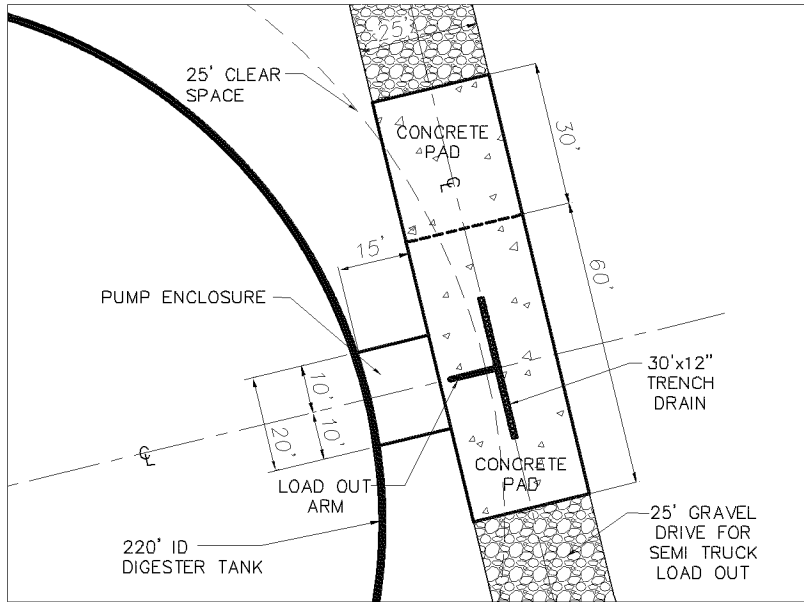
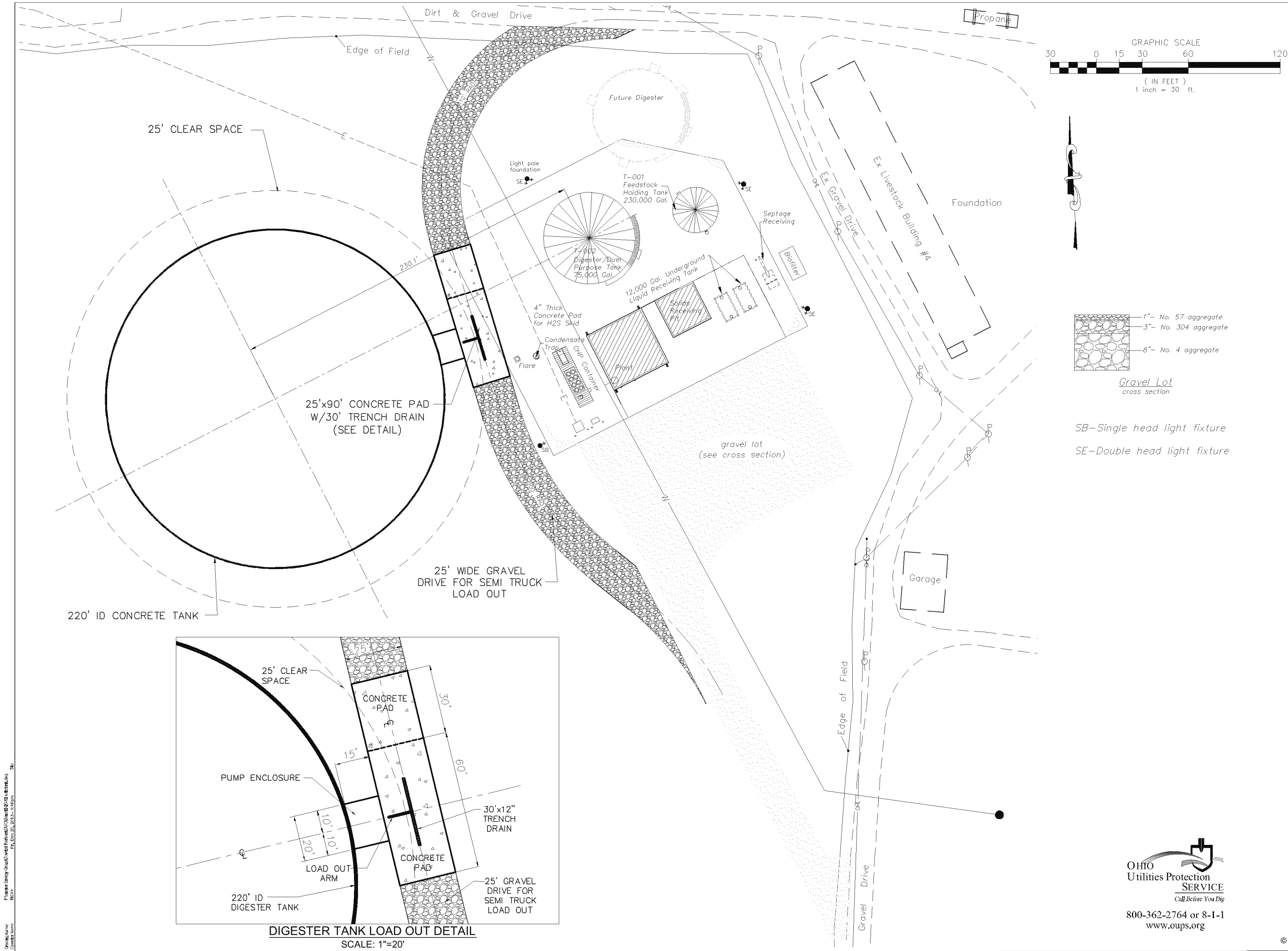


PLANT SLUDGE HYDRAULIC PROCESS FLOW (CONTINUED)



PLANT SLUDGE HYDRAULIC PROCESS FLOW (CONTINUED)

P:\SBE Projects\0060-FAI-OH-11- Dovetail\BUILDING DRAWINGS\CURRENT EFFLUENT STORAGE TANK DRAWING SET (EPA SUBMITAL)\DOVETAIL G-2 (EFFLUENT STORAGE TANK).dwg
2/18/2014 4:13 PM



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PLAN PREPARED BY:

Stone Environmental
Engineering & Science, Inc.
748-A Green Crest Drive
Westerville, Ohio 43081
614-865-1874 Fax 614-865-1879

| | | |
|------|------------|----------|
| 0 | ISSUED | 12/20/13 |
| Rev. | ECN Number | Date |

Drawing Name:
SITE DIMENSION PLAN

Project Name and Address:
**DOVETAIL BIOENERGY
1146 HERR ROAD
FAIRBORN, OHIO 45324
CONSTRUCTION DRAWING**

| | |
|--------------------|-----------------|
| Area: | Sheet Number: |
| Author: | SD-1 |
| Calculated: RAH | Checked: HRS |

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Project Name: Dovetail Bioenergy
Drawing Name: SD-1
Drawing Title: SITE DIMENSION PLAN
Drawing Date: 12/20/13
Drawing Scale: 1"=20'

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STRUCTURAL NOTES

DESIGN SPECIFICATIONS
STRUCTURAL CONCRETE DESIGN CONFORMS TO THE MOST RECENT EDITIONS OF ACI PUBLICATIONS 318 "BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE" AND 350 "CODE REQUIREMENTS FOR ENVIRONMENTAL ENGINEERING CONCRETE STRUCTURES".

DESIGN STRENGTHS
CONCRETE f'_c = 4,000 PSI (28 DAY COMPRESSIVE STRENGTH)

REINFORCING STEEL f_y = 60,000 PSI
A615 OR A996 GRADE 60 BARS

DESIGN LOADING
DIGESTER EFFLUENT LOADING (INSIDE): 65 PSF/FT
ALLOWABLE FOUNDATION BEARING CAPACITY: 3,000 PSF

CONCRETE CONSTRUCTION
ALL MATERIALS AND METHODS OF CONSTRUCTION SHALL BE IN ACCORDANCE WITH ACI 301 AND 318 REQUIREMENTS. IN ADDITION TO ACI 301 AND 318, APPLICABLE DESIGN MIX AND PROPORTIONING REQUIREMENTS OF ODOT (OHIO DEPARTMENT OF TRANSPORTATION) CONSTRUCTION AND MATERIAL SPECIFICATION FOR CONCRETE CLASS OC1 CONTAINED IN 499 AND 511 SHALL APPLY.

ALL CONCRETE SURFACES EXPOSED TO AIR, UNLESS OTHERWISE NOTED IN SPECIFICATIONS, SHALL BE TREATED WITH AN APPROPRIATE CURING COMPOUND AS SOON AS CONCRETE FINISHING IS COMPLETED OR FORMS ARE REMOVED.

OUTSIDE CORNERS OF EXPOSED CONCRETE SHALL BE FINISHED WITH A 3/4" CHAMFER.

CONCRETE DELIVERED TO THE SITE SHOULD MEET TEMPERATURE REQUIREMENTS OF ASTM C94. CONCRETE SHOULD NOT BE PLACED UPON FROZEN SOILS OR SOILS WHICH CONTAIN FROZEN MATERIAL. CONCRETE SHOULD BE PROTECTED FROM FREEZING UNTIL THE NECESSARY STRENGTH IS ACHIEVED. FROST SHOULD NOT BE PERMITTED TO PENETRATE BELOW FOOTINGS BEARING ON FROST SUSCEPTIBLE SOIL SINCE SUCH FREEZING COULD HEAVE AND CRACK THE FOOTINGS.

UNLESS NOTED OTHERWISE ON THE DRAWINGS, REINFORCING STEEL SPLICE LENGTHS SHALL BE AS FOLLOWS:

#5 BARS: 2'-0"
#6 BARS: 2'-8"
#7 BARS: 3'-5"
#8 BARS: 4'-0"

CONSTRUCTION JOINTS
JOINT LOCATIONS SHALL BE AS SHOWN IN THE PLANS. NO HORIZONTAL JOINTS SHALL BE PERMITTED IN THE SLAB. APPROVAL OF THE ENGINEER MUST BE OBTAINED PRIOR TO ADDING ANY JOINTS NOT SHOWN IN THE PLANS.

CONCRETE POURS IN THE FOUNDATION SLAB AND WALLS SEPARATED BY CONSTRUCTION JOINTS SHOWN ON THE DRAWINGS SHALL BE ALTERNATELY PLACED SUCH THAT A MINIMUM OF 48 HOURS HAS PASSED FROM THE TIME OF THE FIRST POUR UNTIL THE TIME OF THE PLACEMENT OF THE ADJACENT SECOND POUR. THE PURPOSE OF THIS PLACEMENT RESTRICTION IS TO ALLOW SHRINKAGE THAT IS TYPICALLY PRESENT DURING THE INITIAL CURING PROCESS TO OCCUR BEFORE THE ADJACENT POUR IS PLACED, AND THEREBY REDUCING STRESSES IN THE WALL CAUSED BY SHRINKAGE FORCES.

PROVIDE A ROUGHENED SURFACE AT CONSTRUCTION JOINT LOCATIONS BY EITHER ROUGHENING THE SURFACE IMMEDIATELY AFTER THE CONCRETE IS PLACED OR BY SANDBLASTING OR AIR-WATER CUTTING AFTER THE CONCRETE HAS HARDENED.

WHERE REQUIRED, HOT APPLIED JOINT SEALER SHALL MEET THE REQUIREMENTS OF ASTM D 6690, TYPE II.

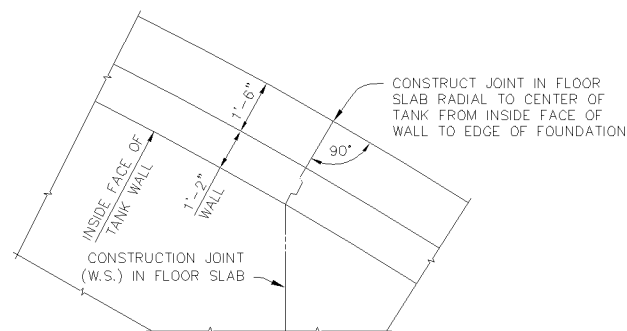
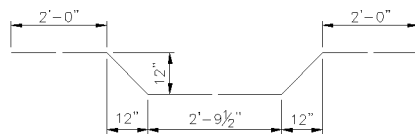
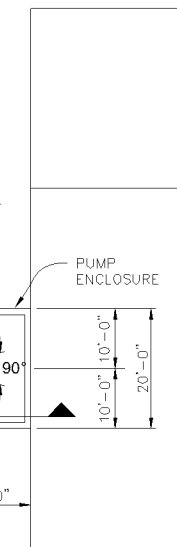
WHERE REQUIRED, COLD APPLIED JOINT SEALER SHALL BE COMPOSED OF A HOMOGENEOUS BLEND OF ASPHALT, RUBBER, INERT FILLER AND A SUITABLE SOLVENT OR SOLVENTS. THE MATERIAL SHALL BE CAPABLE OF BEING INSTALLED BY A HEAVY DUTY AIR OPERATED PUMP OR OTHER DEVICE CAPABLE OF CONTINUOUSLY FEEDING THE COMPOUND UNDER PRESSURE.

GEOTECHNICAL REPORT
GEOTECHNICAL REPORT PREPARED BY PROFESSIONAL SERVICE INDUSTRIES, INC. DATED 4-24-2013. INTERPRETATION OF THE CONTENTS OF THE REPORT IS THE CONTRACTOR'S RESPONSIBILITY.

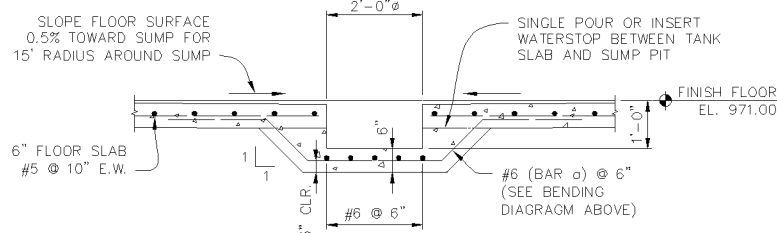
REMOVE ALL TOPSOIL AND ROOT ZONE FROM THE TANK AREA. EXCAVATE TO THE DEPTH SHOWN ON THE SITE PLAN BASED ON RECOMMENDATIONS IN THE GEOTECHNICAL REPORT. IT IS RECOMMENDED THAT THE SUBGRADE BE EVALUATED BY A GEOTECHNICAL ENGINEER TO ASSESS THE SUITABILITY OF THE SOIL LEFT IN PLACE PRIOR TO CONSTRUCTION OF THE TANK FOUNDATION. THE GEOTECHNICAL ENGINEER SHALL PERFORM TESTING TO VERIFY THAT THE ASSUMED ALLOWABLE BEARING CAPACITY LISTED UNDER "DESIGN LOADING" ABOVE IS VALID.

BACKFILL OR FILL SHALL BE PLACED IN LIFTS AND COMPACTED IN ACCORDANCE WITH THE RECOMMENDATIONS CONTAINED IN THE GEOTECHNICAL REPORT.

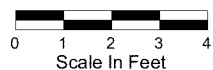
A SAND OR FINE STONE CUSHION AT LEAST 3" IN THICKNESS SHALL BE PLACED UNDER THE TANK FOUNDATION SLAB PRIOR TO CONSTRUCTION OF THE TANK FOUNDATION.

FLOOR SLAB CONSTRUCTION
JOINT DETAIL AT WALL

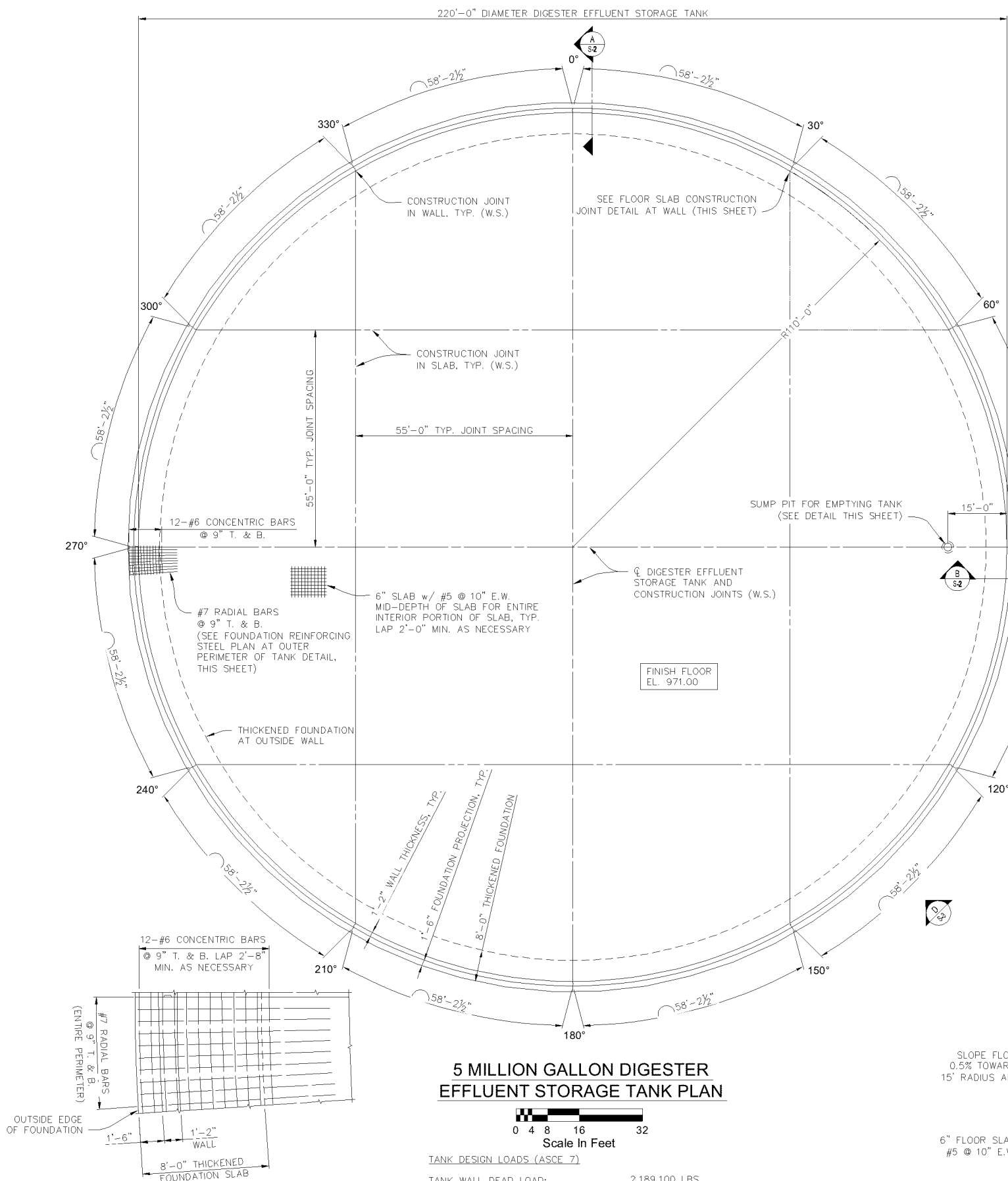
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SUMP PIT DETAIL



REVISED 2/18/14

5 MILLION GALLON DIGESTER
EFFLUENT STORAGE TANK PLAN

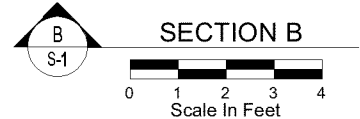
TANK DESIGN LOADS (ASCE 7)



| | |
|-----------------------------------|------------------------------|
| TANK WALL DEAD LOAD: | 2,189,100 LBS |
| TANK FOUNDATION SLAB DEAD LOAD: | 3,908,300 LBS |
| FLUID WEIGHT: | 43,437,765 LBS |
| TANK FLOOR PRESSURE FROM FLUID: | 1,143 PSF |
| TANK FOUNDATION BEARING PRESSURE: | 1,218 PSF (@ MIDDLE OF TANK) |
| | 1,671 PSF (@ OUTER WALL) |
| WIND SHEAR: | 27,385 LBS |
| WIND OVERTURNING MOMENT: | 191,695 LB-FT |
| SEISMIC BASE SHEAR: | 853,774 LBS |
| SEISMIC OVERTURNING MOMENT: | 58,627,241 LB-FT |

FOUNDATION REINFORCING STEEL PLAN
AT OUTER PERIMETER OF TANK

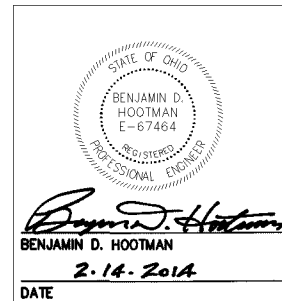
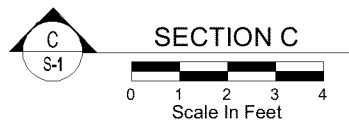
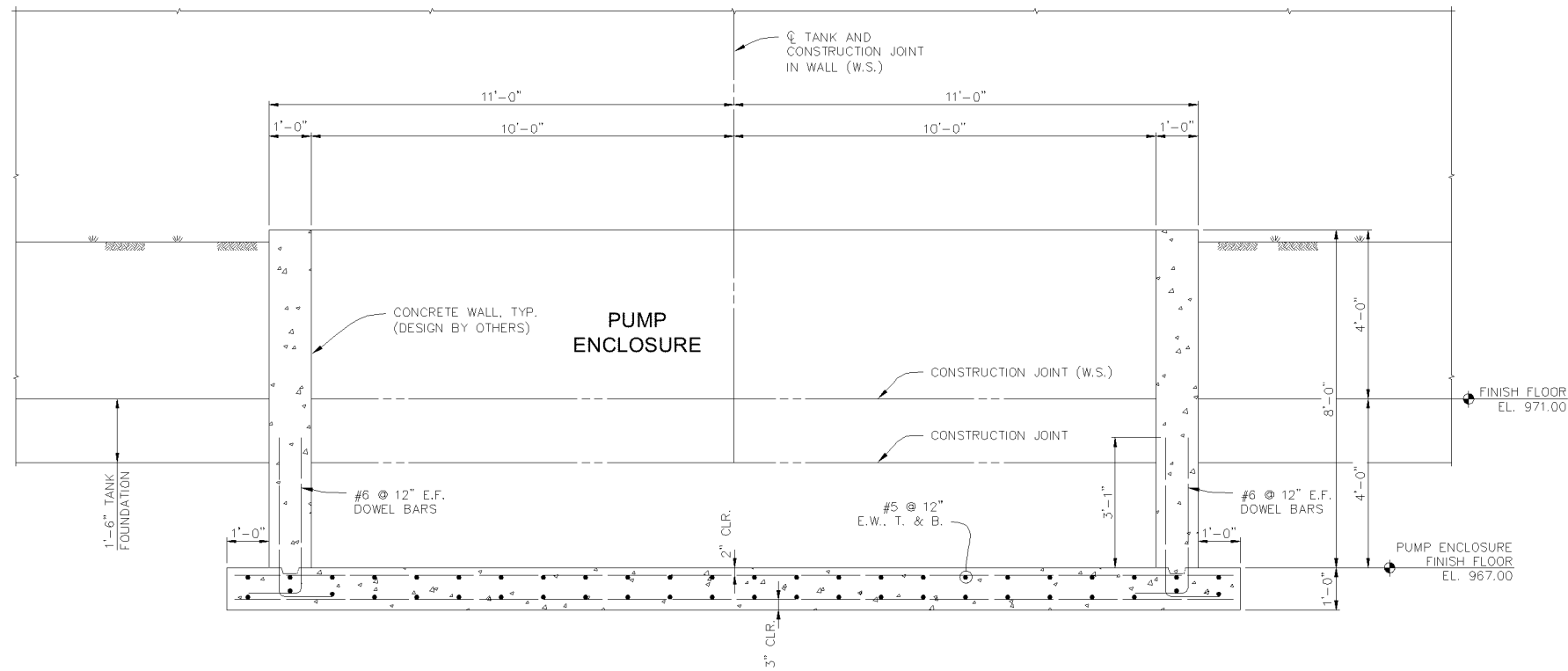
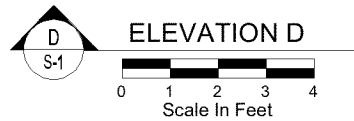
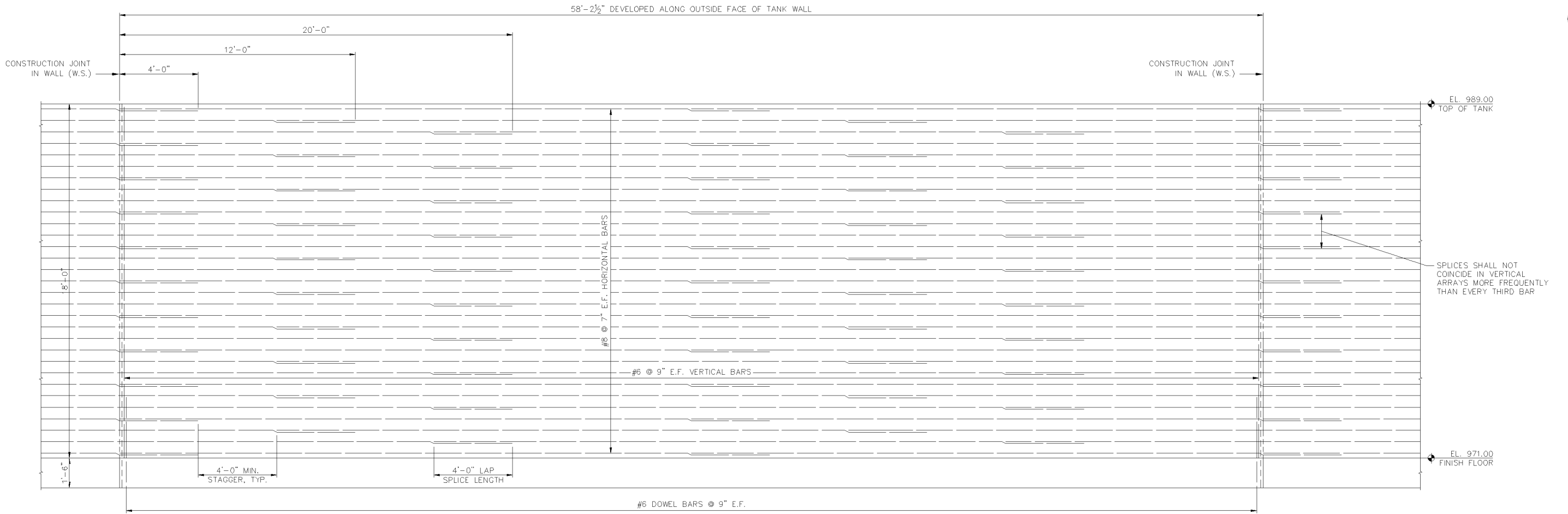
M:\14035\AutoCAD EFFLUENT STORAGE-STRUCTURAL.dwg - Tank Plan ~ Feb 18, 2014 - 3:26pm

| | | | |
|---|---|--|-----------------|
| | ea ENGINEERING ASSOCIATES — INC — | 1935 Eagle Pass | DESIGNED BDH |
| | | Wooster, Ohio 44691 | DRAWN BDH |
| | | Phone : (330) 345-6556 | REVIEWED REP |
| | | Fax : (330) 345-8077 | DATE 2/14/14 |
| QUASAR ENERGY GROUP DIGESTER EFFLUENT STORAGE TANK FAIRBORN, OH FACILITY | | STRUCTURAL STORAGE TANK PLAN AND SECTION | |
| | | 2.14.2014 DATE | |



| | | | | |
|---|---|------------------------|-----|----------|
|  |  | 1935 Eagle Pass | | DESIGNED |
| | | Wooster, Ohio 44691 | | BDH |
| | | Phone : (330) 345-6556 | | DRAWN |
| | | Fax : (330) 345-8077 | | BDH |
| | | REVIEWED | REP | |
| | | DATE | | 2/14/14 |

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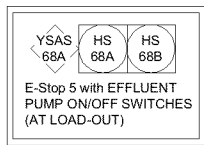
ea
ENGINEERING ASSOCIATES
INC.

1935 Eagle Pass
Wooster, Ohio 44691
Phone : (330) 345-6556
Fax : (330) 345-8077

QUASAR ENERGY GROUP
DIGESTER EFFLUENT STORAGE TANK
FAIRBORN, OH FACILITY

STRUCTURAL
TANK DETAILS

DESIGNED
BDH
DRAWN
BDH
REVIEWED
REP
DATE
2/14/14

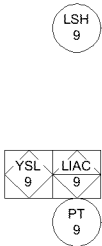


EFFLUENT TRUCK TIE-IN FOR TOP LOADING FROM PUMP P-004

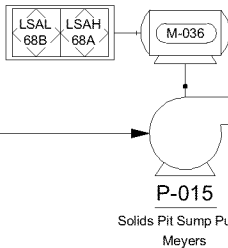
EFFLUENT TRUCK TIE-IN FOR BOTTOM LOADING FROM PUMP P-004

SL 0072-671-0001 6867A Effluent Storage Tank [T-008]

EFFLUENT TRUCK TIE-IN FOR RECEIVING TANK

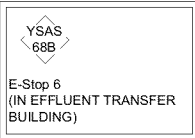
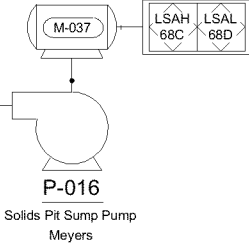


T-009
Underground Concrete Receiving Tank
9'6" X 17'6" X 14'4"
12,000 gal.



SL 6867B 0072-671-0001 Effluent Storage Tank [T-008]

SL 0072-671-0001 6867C Effluent Storage Tank [T-008]



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Phone: 216.986.9999

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Drawing Name: 0072-681-0001
Effluent Pumping

Project Name and Address:
Dovetail Bioenergy
Anaerobic Digestion facility
Ecofarmssystem
0060-FAI-OH-11
1146 Herr Road
Fairborn, Ohio, 45324

| | |
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| Area: 68 | Sheet Number: I-1 |
| Author: BR | |
| Calculated: | Checked: |



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| Rev. | ECN Number | Date |

| | |
|-----------------------|---------------|
| Drawing Name: | 0072-67I-0001 |
| Effluent Storage Tank | |

| | |
|--|--|
| Project Name and Address: | |
| Dovetail Bioenergy Anaerobic Digestion facility Ecofarmssystem | |
| 0060-FAI-OH-11 1146 Herr Road Fairborn, Ohio, 45324 | |

| | |
|---------------|----------------------|
| Area: 67 | Sheet Number: I-2 |
| Author: BR | |
| Calculated: | Checked: |

